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Research Article

Diversity of the genus *Bledius* (Staphylinidae: Coleoptera) in Basrah Province, Iraq

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Abstract
This study aimed to enlist the species of the genus *Bledius* in Basrah Province, Iraq. The results showed the presence of two groups of the *Bledius* genus, including *Gigantulus* and *Kochi*. In total seven species belong to the genus *Bledius,* viz. *B. limicola, B. hoplites, B.* (*gigantulus)* sp.n.*, B. spectabilis, B. (kochi)* sp.n.*, B. hinnulus,* and *B. bicornis* were collected from Basrah Province, South of Iraq. Description of the main morphological characters of males was provided along with their illustrations and identification key.

Keywords: Insect, Checklist, *Bledius*, Diversity.

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Introduction

Family Staphylinidae of the Coleoptera order, is a widespread family, including 34 subfamilies, and the largest one is Oxytelinae (Brunke et al. 2011). It contains more than 2000 species around the world (Makranczy 2006). Leach (1819) recorded the genus *Bledius* in this subfamily (Herman, 1972). They inhabit river banks, beaches, and wet farmlands, and are phytophagous, and are also fed animal dang (Frank & Ahn 2011). Herman (1983) divided *Bledius* into two main groups of emarginatus and annularis depending on their labrum. The genus *Bledius* contains more than 430 species, divided into 34 groups (Herman, 1986). Erichson (1979) described 45 *Bledius* species, and Victor (1951) described 26 species within 8 groups. In India, Biswas (2008) published a taxonomic key that includes 30 species within 3 subgenera. Zheng (1998) published a taxonomic key for the Chinese species belonging to the *Gigantulus* group. This study aimed to enlist the species of the genus *Bledius* in Basrah Province, Iraq.

Materials and methods

Study area: The study area was Shat-Alarab and Alhartha districts, Basrah Province, south of Iraq (30.65800, 47.89619 and 30.38391, 47.40817, respectively). The samples were collected from February-June 2020 using light traps and preserved in 70% ethanol. All specimens were photographed using Leica EZ 4HD binocular dissecting microscope at the laboratory of Entomology, Department of Biology, College of Science.

Results

According to Herman (1986), the results showed that the presence of two groups of the *Bledius* genus viz. *Gigantulus* and *Kochi* and the species for these two groups are classified based on Schülke (2010), Biswas (2008), and Makhan (2017) and presented here.

Group 1: *Gigantulus*

This group can be isolated from others by having the following characteristics: Supra antennal ridge in males prominent, not elongated, gular sutures fused anteriorly, labrum not incision, mandibles bidentate, pronotal horn present in males and absent in females, pronotal marginal bead complete from a lateral view,

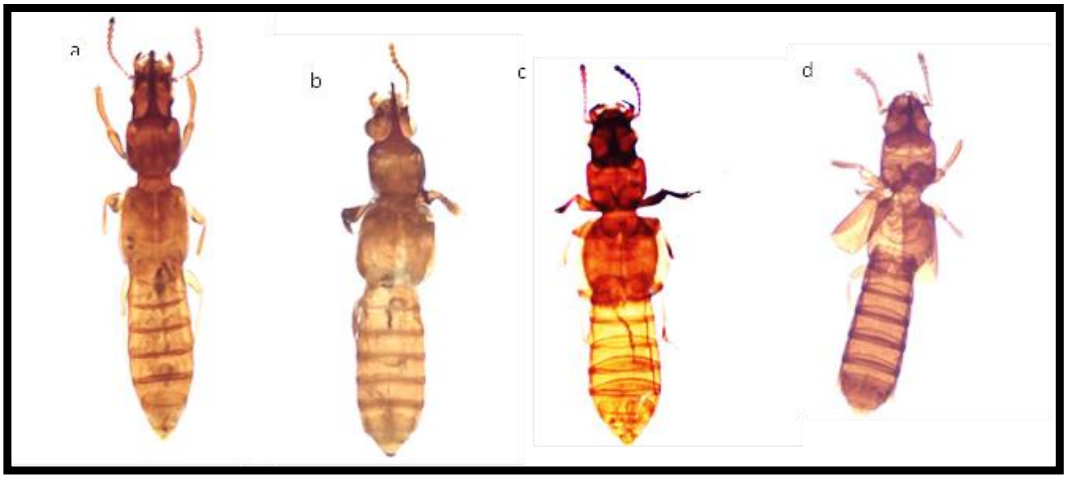

Fig.1. Habitus of the males of the genus *Bledius*. Dorsal view: a: *B. limicola*, b: *B. hoplites*, c: *B.* (*gigantulus)* sp.n., and d: *B. spectabilis* (Scale bars = 0.5mm).

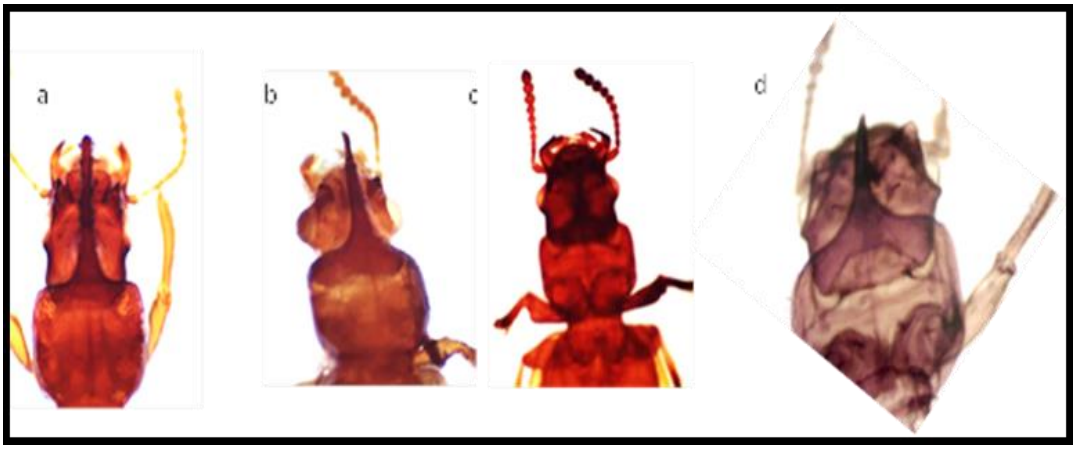

Fig.2. Head and pronotum of the males: Dorsal view, a: *Bledius limicola*, b: *B. hoplite*, c: *B.* (*gigantulus*) sp.n.,and d: *B. spectabilis* (Scale bars = 0.4mm).

procoxal fissure open, clypeal margin not reflexed, elytral epipleural ridge complete.

Bledius limicola

(Male =50, Female=30)

Total length: 4.5-5mm.

Coloration: Head and pronotum reddish-brown, antennae and legs yellowish-brown, abdominal segments yellowish-brown, last two abdominal segments reddish-black (Fig. 1a).

Morphology: In dorsal view, mouthparts visible, eyes slightly protruding from supra antennal ridge, pronotal horn elongated protruding between supra antennal ridge, front of pronotal horn containing soft setae, pronotum about 1.8 times wider than distance between eyes (Fig. 2a). In lateral view, pronotum cylindrical, convex from top, not exceed mouthparts, supra antennal ridge prominent over eyes (Fig. 3a). In ventral view of head, gular sutures fused anteriorly and open posteriorly (Fig. 4a).

Aedeagus: The two parameres are arched at the base and straight parallel at the ends (Fig. 7a).

Bledius hoplites

(Male = 21, Female = 7)

Total length: 4.3-4.8mm

Coloration: Head and pronotum reddish-black, antennae and legs yellowish-brown, abdominal segments yellowish-brown, and last two abdominal segments black (Fig. 1b).

Morphology: In dorsal view, mouthparts somewhat visible, eyes protrude from supra antennal ridge. Pronotal horn elongated, protruding between supra

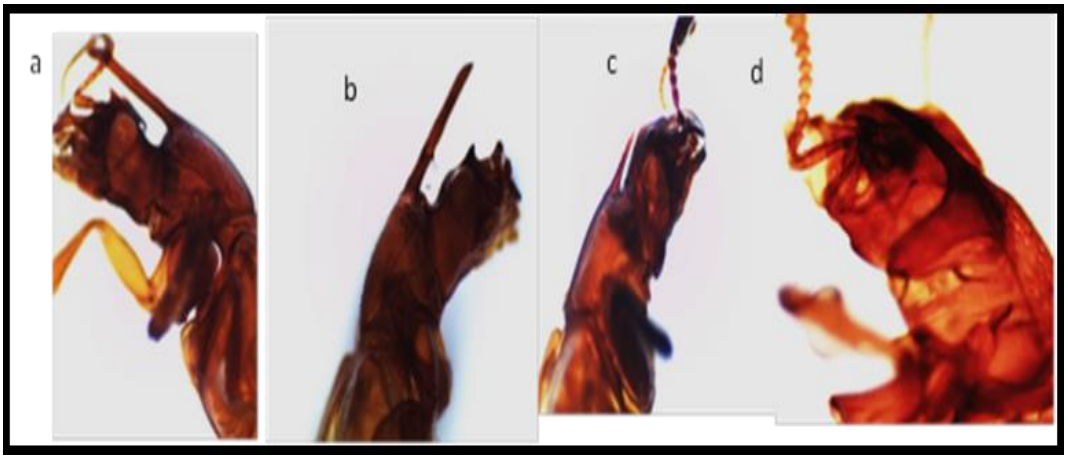

Fig.3. Head and pronotum of the males: Lateral view, a: *Bledius limicola***,** b: *B. hoplites,* **c**: *B.* (*gigantulus*) sp.n., and d: *B. spectabilis* (Scale bars = 0.4mm).

antennal ridge; front part of pronotal horn has no hair, possessing a beak-like edge; pronotum about and 1.3 times wider than distance between eyes (Fig. 2b). In lateral view, pronotum cylindrical, convex from top, exceed mouthparts, supra antennal ridge prominent over eyes (Fig. 3b). In ventral view of head, gular sutures fused anteriorly and incision posteriorly (Fig. 4b).

Aedeagus: The two parameres are arched at the base, converging in the middle and far apart at the end (Fig. 7b).

***Bledius* (*gigantulus)* sp.n.**

(Male = 15, Female = 13) **Total length:** 3.6-3.9mm

Coloration: Head and pronotum reddish-black, antennae and legs yellowish-brown, abdominal segments yellowish-brown, and last two abdominal segments black (Fig. 1c).

Morphology: In dorsal view, mouthparts visible, eyes slightly protruding from supra antennal ridge, pronotal horn too short to extend beyond supra antennal ridge, pronotum about 1.7 times wider than distance between eyes (Fig. 2c). In lateral view, pronotum flat and centre line prominent, supra antennal ridge very small, like a knob (Fig. 3c). In ventral view of head, gular sutures fused anteriorly and open posteriorly (Fig. 4c).

Aedeagus: The two parameres are arched at the base, converging in the middle and far apart at the end (Fig. 7c).

Bledius spectabilis

(Male = 23, Female = 32)

Total length: 4.5-4.9mm

Coloration: black, antennae and legs brown, and elytra reddish black (Fig. 1d).

Morphology: In dorsal view, mouthparts not visible, eyes slightly protruding from supra antennal ridge, pronotal horn elongated, protruding between supra antennal ridge, front part of the pronotal horn without hair, bearing a beak-like edge, pronotum about 1.8 times wider than distance between eyes (Fig. 2d). In lateral view, pronotum flat and center line prominent, exceed mouthparts; supra antennal ridge prominent over eyes (Fig. 3d). In ventral view of head, gular sutures fused anteriorly and incision posteriorly (Fig. 4d).

Aedeagus: The two parameres are arched at the base, not parallel, and converging at the end (Fig. 7d).

***Kochi* group**

This group can be identified from the rest of the groups by the following taxonomic characteristics: Supra antennal ridge prominent, gular sutures fused anteriorly, labrum not incision (Fig. 14), mandibles bidentate (fig. 15). Pronotal horn absent in males, pronotal marginal bead complete from lateral view, procoxal fissure open, clypeal margin not reflexed,

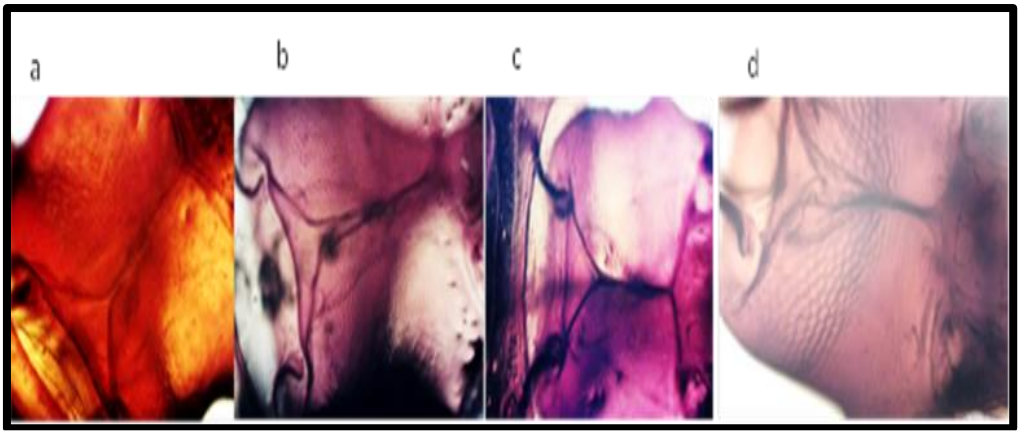

Fig.4. Head of the male: Ventral view, a: *Bledius limicola* , b: *B. hoplites* ,c: *B.* (*gigantulus)* sp.n., and d: *B. spectabilis* (Scale bars= 0.3mm).

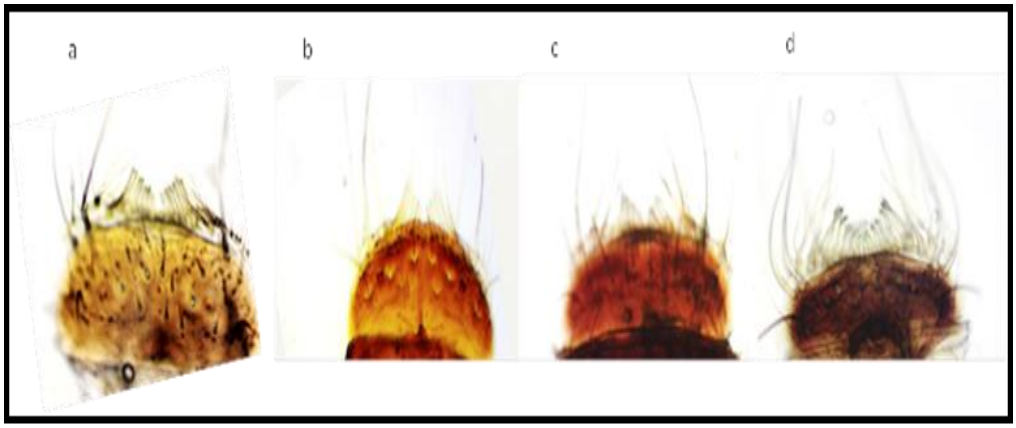

Fig.5. Labrum, a: *Bledius limicola*, b: *B. hoplites*, c: *B.* (*gigantulus)* sp.n., d: *B. spectabilis* Scale bars = 0.2mm).

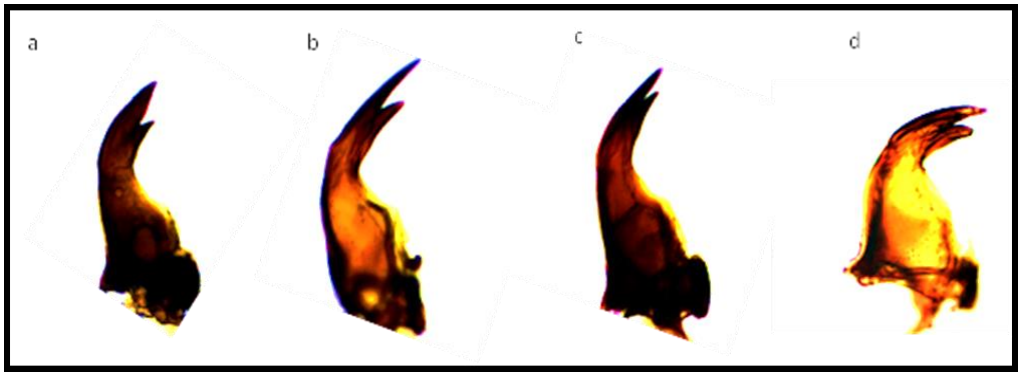

Fig.6. Mandibles, a: *B. limicola***,** b: *Bledius hoplites*, c: *B.* (*gigantulus)* sp.n., and d: *B. spectabilis* (Scale bars = 0.2mm).

elytral epipleural ridge complete from lateral view, present posterior margin membranous lobe, in metatibia one subapical spinelike seta on lateral surface.

***Bledius (kochi)* sp.n.**

(Male = 21, Female = 20)

Total length: 4.5-5mm

Coloration: Head and pronotum reddish-black, antennae and legs yellowish-brown, abdomenal segments brown, last two abdominal segments black (Fig. 8a).

Head: Dorsal view, bristles and margins of labrum visible, supra antennal ridge very close together, eyes large, lateral edges of head round (Fig. 10a). In ventral view, gular sutures fused anteriorly and

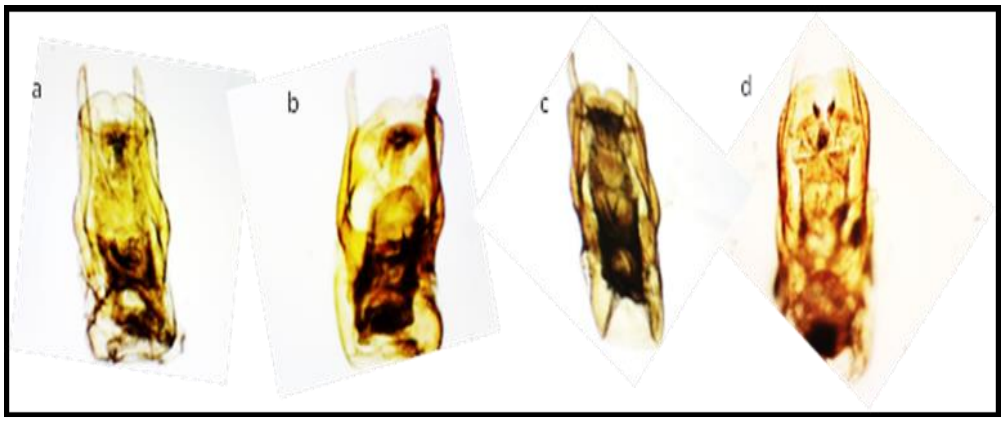

Fig.7. Aedeagus: a: *Bledius limicola*, b: *B. hoplites*, and c: *B.* (*gigantulus*) sp.n., and d: *B. spectabilis* (Scale bars= 0.1mm).

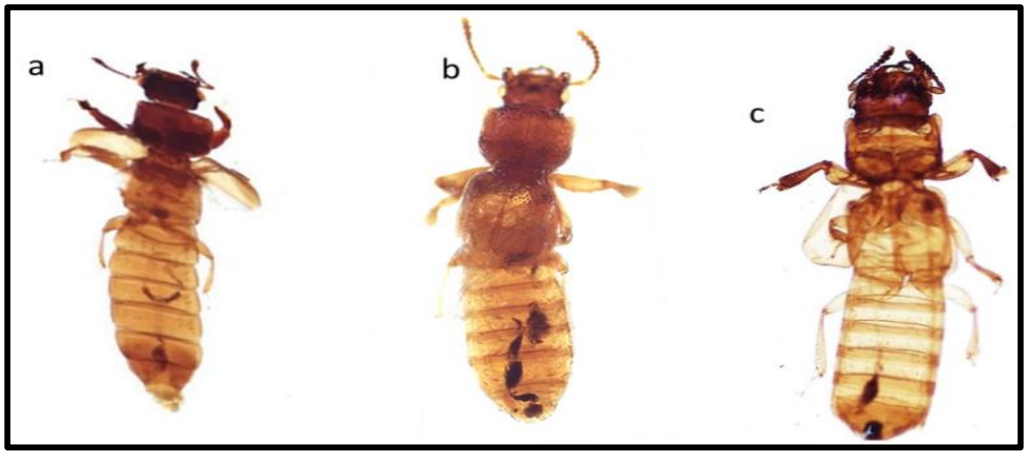

Fig.8. Habitus of the males: Dorsal view, a: *Bledius (kochi)* sp.n., b: *B. hinnulus*, and c: *B. bicorni*, (Scale bars = 0.5mm).

incision posteriorly (Fig. 12a).

Antenna: Antenna consists of 11 segments, first bulging at tip, second and third are conical, from fourth to eighth equal spherical, ninth and tenth spherical larger than rest, eleventh elongated (Fig. 13a).

Pronotum: Dorsal view, neck prominent, pronotum wider than head about 2.0 (Fig. 9a), Ventral view, procoxae are separated and furca sternum is elongated between them, pronotal marginal bead separated hypomere (Fig. 11a).

Abdomen: Abdominal tergum edges present, the sixth tergite is somewhat wider than the seventh, and the eighth tergite is prominent (Fig. 16a).

Aedeagus: Parameres longer than median lobe, apex of median lobe cylindrical, not bisected (Fig. 17a).

Bledius hinnulus

(Male = 17, Female = 4)

Total length: 4.4-4.5mm

Coloration: Head and pronotum brown-black, antennae and legs yellowish-brown, abdominal segments brown, the last two abdominal segments black (Fig. 8b).

Head: In dorsal view, bristles and margins of labrum visible, supra antennal ridge far apart, the eyes a bit small, lateral edges of head slightly flattened (Fig. 10b). In ventral view, sutures fused anteriorly and incision posteriorly (Fig. 12b).

Antenna: Antenna consists of 11 segments, first bulging at tip, second and third conical, from fourth to five equal, from six to ten gradually increasing in width, eleventh spherical (Fig. 13b).

Pronotum: In dorsal view, neck absent, pronotum wider than head about 1.5 (Fig. 9b). In ventral view, procoxae adjacent, pronotal marginal bead separated hypomere (Fig. 11b).

Abdomen: Abdominal tergum edges absent, seventh

Fig.9. Head and pronotum of male, Dorsal view, a: *Bledius (kochi)* sp.n., b: *B. hinnulus*, and c: *Bicornes* (Scale bars = 0.4mm).

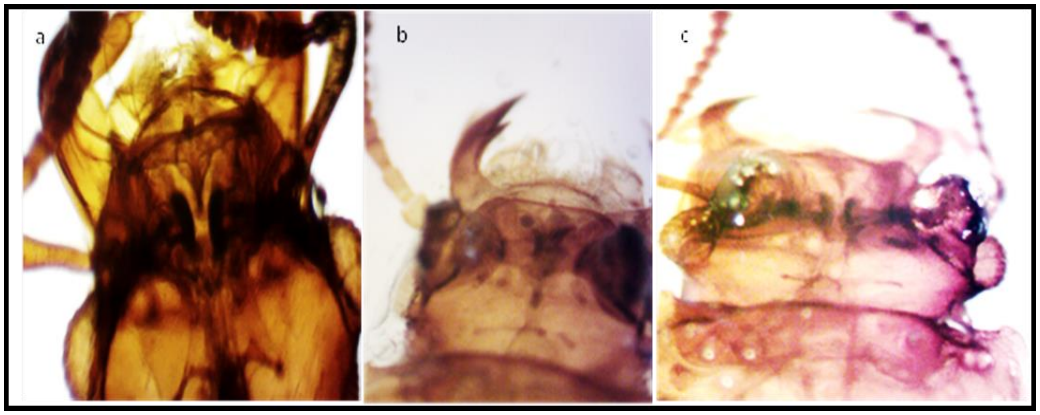

Fig.10. Head of the males: Dorsal view, a: *Bledius (kochi)* sp.n., b: *B. hinnulus*, and c: *B. bicornis* (Scale bars = 0.3mm).

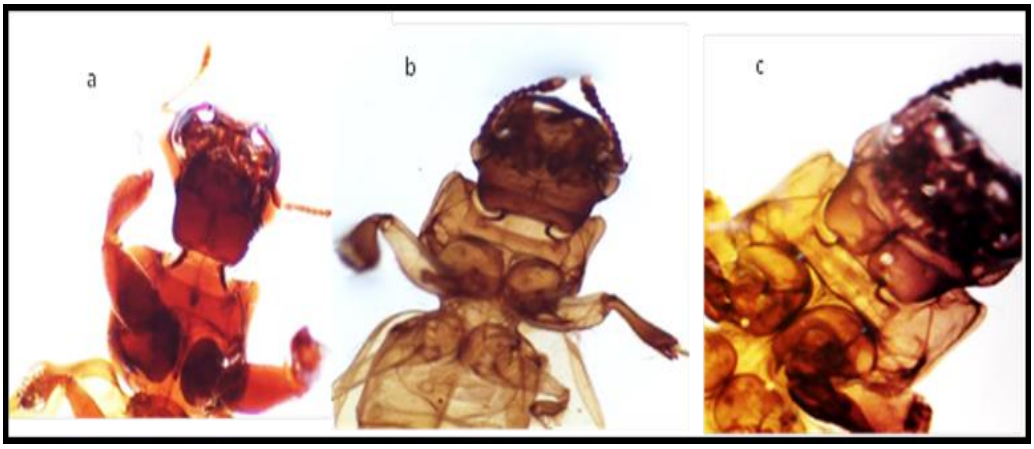

Fig.11. Head and pronotum of male: Ventral view, a: *Bledius (kochi*) sp.n., b: *B. hinnulus*, and c: *B. bicornis* (Scale bars = 0.4mm).

tergite somewhat wider than sixth, and eighth tergite prominent (Fig. 16b).

Aedeagus: Parameres longer than median lobe, apex of median lobe flattened and bisected (Fig. 17b).

Bledius bicornis

(Male = 21, Female = 9)

Total length: 4.6-4.9mm

Coloration: Head and pronotum brown-black, antennae and legs yellowish-brown, abdominal

Fig.12. Head of the males: Ventral view, a: *Bledius (kochi)* sp.n., b: *B. hinnulus*, and c: *B. bicornis* (Scale bars = 0.3mm).

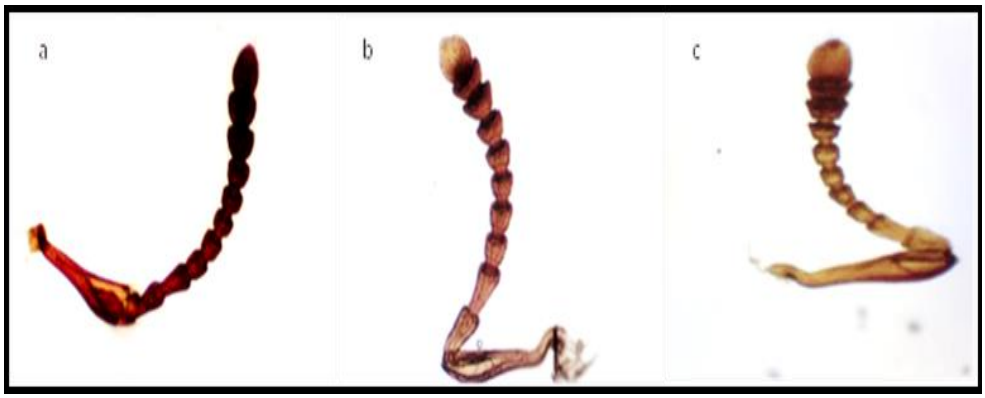

Fig.13. Antenna: a: *Bledius (kochi)* sp.n., b: *B. hinnulus*, and c: *B. bicornis*, (Scale bars = 0.2mm).

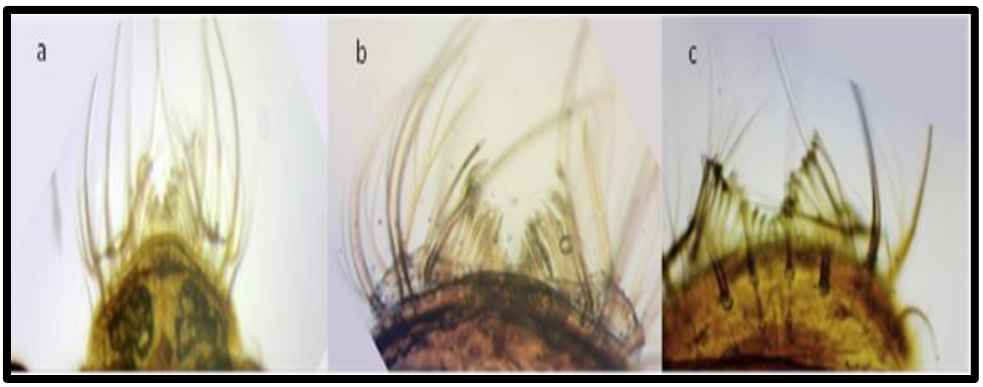

Fig.14. Labrum a: *Bledius (kochi)* sp.n., b: *B. hinnulus*, and c: *B. bicornis* (Scale bars = 0.2mm).

segments brown, last two abdominal segments black (Fig. 8c).

Head: In dorsal view, bristles and margins of labrum not visible, supra antennal ridge far apart, eyes a bit small, lateral edges of head slightly flattened (Fig. 10c). In ventral view, gular sutures fused anteriorly and incision posteriorly (Fig. 12c).

Antenna: Antenna consisting of 11 segments, first one bulging at tip, second segment cylindrical, wider than third, third one conical, longer than fourth one, from fourth to eighth, decreasing in length and increases in width, ninth and tenth very close and wider than rest, eleventh one spherical (Fig. 13c).

Pronotum: In dorsal view, neck absent, pronotum wider than head about 1.3 (Fig. 9c). In ventral view, procoxae adjacent, pronotal marginal bead separated hypomere (Fig. 11c).

Abdomen: Abdominal tergum edges present,

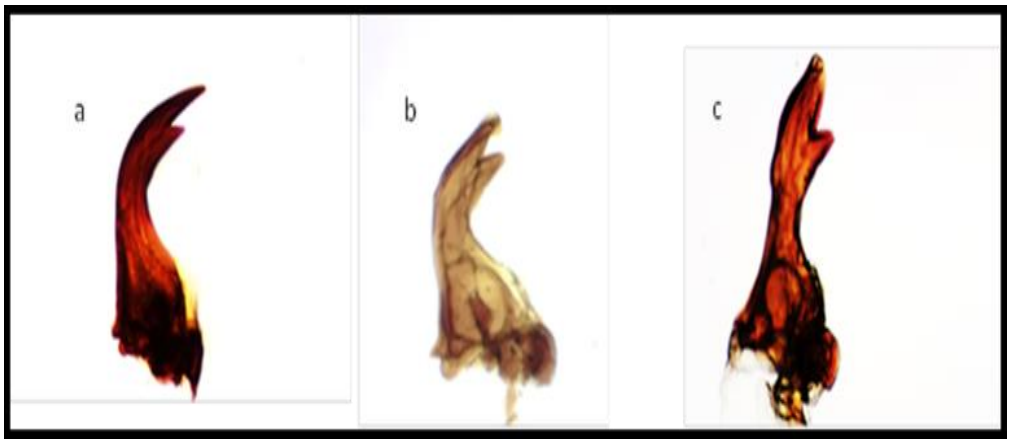

Fig.15. Mandibles: a: *Bledius (kochi)* sp.n., b: *B. hinnulus*, and c: *B. bicornis* (Scale bars = 0.2mm).

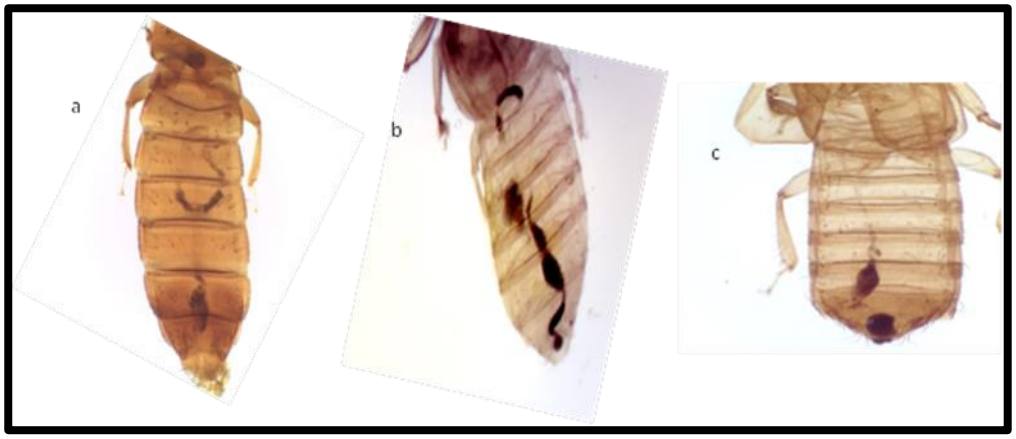

Fig.16. Abdomen: Dorsal view: a: *Bledius (kochi)* sp.n., b: *B. hinnulus*, and c: *B. bicornis* (Scale bars= 0.4mm).

seventh abdominal tergite wider than sixth one, eighth one not prominent overlapping with seventh tergite (Fig. 16c).

Aedeagus: Parameres longer than median lobe, qnd apex of median lobe flattened and incision (Fig.17c).

Remarks: *Bledius* (*gigantulus*) sp.n. differs from the rest of the species but is closely related to *B. jiangmenensis*. Its pronotal horn is too short extending beyond the supraantennal ridge, the pronotum is flat and the center line is prominent, and supraantennal ridge is very small and almost the same aedeagus (Zheng, 1998). *Bledius* (*kochi*) sp.n. shares with the rest of the species all the characteristics of the group, but it differs in the neck protrusion, the procoxae are separated and the furcasternum is elongated between them. The apex of the median lobe is cylindrical not bisected.

Key to identifying *Bledius* males in Basra Province:

1. Presence of pronotal horn (Fig. 3c) ……..…….2
-Absence of pronotal horn ……..……5
2. Pronotal horn Elongated, crosses supra antennal ridge…….……3
-Pronotal horn short and not cross supra antennal ridge (Fig. 3c) ..... *Bledius gigantulus* sp.n.
3. Top of pronotal horn not contain fine setae 4
-Top of pronotal horn contains fine setaes (Fig. 2a) ……..…… *Bledius limicola*
4. Eyes enlarged and mouthparts prominent from dorsal view (Fig. 2b) ……. *Bledius hoplites*
-Eyes not enlarged and mouth parts not prominent from dorsal view (Fig. 2d) …..… *Bledius spectabilis*
5. Procoxae are adjacent ...……..……. 6

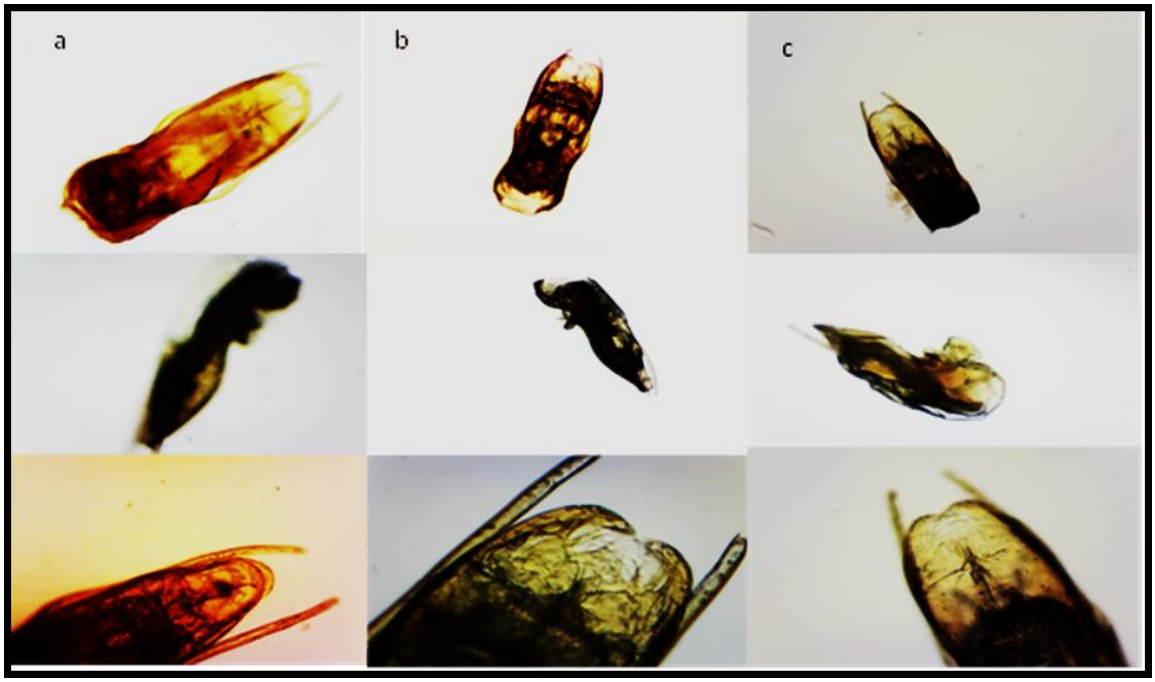

Fig.17. Aedeagus: a: *B. (kochi*) sp.n., b: *B. hinnulus***,** and c: *B. bicornis* (Scale bars = 0.1mm).

-Procoxae separated and furcasternum elongated between them (Fig. 11a) …...… *Bledius (kochi)* sp.n.
6. Mouth parts prominent from dorsal view (Fig. 10b) and end of abdomen pointed (Fig. 16b) ……..…….…..… *Bledius hinnulus*
-Mouth parts not prominent from dorsal view (Fig.10c) and end of abdomen is transverse (Fig. 16c) ..……..… *Bledius bicornis*

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